



White House Issues Clean Water Action Plan

The White House announced, on February 19, 1998, President Clinton's Clean Water Action Plan, which calls on federal, state, and tribal governments to strengthen existing programs to support an accelerated effort to attack the nation's remaining water quality problems. Regulation, economic incentives, technical assistance, research, education, and accurate information all have a role to play in meeting clean water goals. The Action Plan builds on the solid foundation of existing clean water programs and proposes new actions to strengthen efforts to restore and protect water resources.

The plan calls for numerical limits for phosphorous, nitrogen, and biological factors by the year 2000, which will then be used as criteria for water quality assessment measures. Biological criteria may include abundance and diversity of species. According to the Environmental Protection Agency's Assistant Administrator for Water, these developments come in an effort to make the program more amenable to watershed approaches. These criteria would not be the same for each type of waterbody considered, but would be based more on an "eco-region approach."

The plan calls for the EPA and the Army Corps of Engineers to be given the task of enforcing programs that would increase restored wetlands by 100,000 acres/year by 2005 (28 ER 1255). This is to be achieved by ensuring that existing wetland programs continue to slow the rate of wetland losses, improving federal restoration programs, and by expanding incentives to landowners to restore wetlands.

Under this plan, the EPA, and the National Oceanic and Atmospheric Administration (NOAA), in conjunction with tribal, state, and local authorities, are to expand programs

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See also: <http://environ.spawar.navy.mil/Programs/MESO/Newsltr/newsltr.html>

addressing mercury and other bioaccumulative toxic pollutants in order to make locally caught fish and shellfish safe to eat. Surveys will be conducted from 1998-2000 in order to gain enough data in order to compose these programs efficiently.

Federal agencies, led by NOAA will work in partnership to improve the monitoring of coastal waters, expand research of emerging problems like *Pfiesteria*, amend Fishery Management Plans to address water quality issues, and ensure the implementation of strong programs to reduce polluted runoff to coastal waters. Currently, 29 coastal states and territories have developed programs to prevent polluted runoff to coastal waters. The EPA will publish final Phase II storm water regulations for smaller cities and construction sites in 1999. The EPA will also work with its partners to make sure that existing storm water control requirements for large urban and industrial areas are implemented as required.

Watershed Restoration Action Strategies will spell out the most important causes of water pollution and resource degradation, detail the actions that all parties need to take to solve those problems, and set milestones by which to measure progress. A Watershed Strategy creates an opportunity to bundle TMDLs (Total Maximum Daily Loads) to strike an appropriate balance between controls over discharges and polluted runoff, and to consider other water-related problems in the watershed, including wetland loss, sediment contamination, aquatic species habitat degradation, drinking water protection, and health of riparian areas. Funds made available to federal agencies through the FY 1999 Clean Water and Watershed Restoration Budget Initiative will be used to help states implement these strategies. Federal agencies will provide small grants to local organizations that want to take a leadership role in building local efforts to restore and protect watersheds.

To support the new and expanded efforts proposed in this plan, the President's FY99 budget proposes a Clean Water and Watershed Restoration Budget Initiative. The budget calls for a \$568 million total increase from the FY98 budget (a 35% total increase), and a \$2.2 million increase between the years 1999 and 2000. Specifically, the Clean Water and Watershed Restoration Budget Initiative will:

1. increase direct support to states and tribes to carry out a watershed approach to clean water;
2. increase technical and financial assistance to farmers, ranchers, and foresters to reduce polluted runoff and enhance the natural resources on their lands;
3. fund watershed assistance programs and grants to engage local communities and citizens in leadership roles in restoring their watersheds;
4. accelerate progress in addressing critical water quality problems on federal lands, including those related to roads, abandoned mines, riparian areas, and rangelands;
5. expand and coordinate water quality monitoring programs; and
6. increase efforts to restore nationally significant watersheds, such as the Florida Everglades and the San Francisco Bay-Delta.

Regular reports are to keep the public apprised of progress and remaining challenges. By the end of the year 2000, and periodically thereafter, status reports on progress in implementing watershed restoration plans and related programs are to be provided to the President, the nation's governors, tribal leaders, and the public.

*The White House, Clean Water Action Plan (<http://www.epa.gov/cleanwater>), February 19, 1998.
Environment Reporter, Volume 28, Number 36, January 16, 1998, pp.1761-1763.*

RWQCB Adopts 303(d) List Of Impaired Waterbodies In San Diego Bay

On January 8, 1998, the San Diego Regional Water Quality Control Board (RWQCB), proposed Resolution No.98-12, designating areas of the San Diego Bay Region as impaired waterbodies under Section 303(d) of the Clean Water Act (CWA). Impaired water bodies listed in the CWA Section 303(d) are designated as those for which current pollution control measures are not sufficient enough to meet water quality standards. For such waterbodies, States are required to derive Total Maximum Daily Loads (TMDLs) for each source of pollution to the waterbody. Pollutant loads for point sources, nonpoint sources, natural sources, and a safety margin are all added together to derive this numerical value which can be used to determine how much of each pollutant source can be discharged on a daily basis and yet still maintain water quality standards.

On February 11, 1998, despite opposition from industry, the Port of San Diego, and the Navy, the RWQCB voted 8:1 to approve the list, resulting in the inclusion of the following areas within San Diego Bay to the Section 303(d) list of the Clean Water Act with a "high" TMDL development priority. The areas of the designated waterbodies as adopted in the resolution are in parentheses.

- Naval Submarine Base San Diego (16 acres): November, Mike and Sierra Piers;
- Grape Street (7 acres): presently an anchorage area; historically home to the Embarcadero Tuna Fleet.
- Downtown Piers (10 acres): Cruise Ship Terminal; B Street Pier (Customs); Broadway Pier; Navy Pier;
- Switzer Creek (6 acres);
- Coronado Bridge (30 acres): Commercial Shipyards;
- Chollas Creek (14 acres);
- Naval Station San Diego (76 acres): Piers 1-8;

- Seventh Street Channel (9 acres): Paleta Creek; and
- 24th Street Marine Terminal (10 acres): National City Marine Terminal.

These waterbodies were listed as impaired as they were deemed by the RWQCB to be "Not Supporting" their designated "Beneficial Uses" (Aquatic Life) with benthic community degradation and sediment toxicity cited as the "Impairment." The data used to ascertain the impairment of the waterbodies was taken from the 1996 report, *Chemistry, Toxicity, and Benthic Community Conditions in Sediments of the San Diego Bay Region*, (a joint report issued by the State Water Resources Control Board, the National Oceanic and Atmospheric Administration, California Fish and Game, and Moss Landing Marine Laboratories), in which these areas were termed pollution "hotspots." TMDL development for the areas listed above was scheduled to begin in 1998, and completed within two years.

San Diego Regional Water Quality Control Board, "Public Notice for Draft Clean Water Act Section 303(d) List," January 8, 1998.

NPDES Phase II Storm Water Regulation Update

The Regional Administrators of Environmental Protection Agency Regions 1, 2, 3, 7, 8, 9 and 10 issued final National Pollutant Discharge Elimination System (NPDES) general permits for storm water discharges associated with construction activity. The EPA first issued permits for these activities in September 1992. These permits subsequently expired in September 1997. Phase II storm water regulations have expanded the existing NPDES Storm Water Program to regulate certain commercial operations, areas with separate sewer systems serving 100,000 people or less, and small municipalities and construction sites affecting areas of between 1 to 5 acres.

The EPA has reissued the general permit which authorizes the discharge of pollutants in storm water associated with construction activity disturbing at least five acres, or construction activity disturbing less than five acres which is part of a larger common plan of development or sale with the potential to disturb cumulatively five or more acres (see 40 CFR 122.26(b)(14)). This construction general permit is written as if it was a single permit rather than the 45 legally separate and individually numbered general permits. This permit replaces the previous Baseline Construction General Permit which was issued for a five-year term in September 1992. The most significant changes from the 1992 permit include:

- New conditions to protect listed endangered and threatened species and critical habitats;
- Expanded coverage to construction sites under five acres of disturbed land which are not part of a larger common plan of development or sale when an operator has been designated by the Director to obtain coverage pursuant to 40 CFR 122.26(a)(1)(v) or 122.26(a)(9) and 122.26(g)(1)(i);

- A requirement to post the confirmation of permit coverage (the permit number or copy of the Notice of Intent (NOI) if a permit number has not yet been assigned) including a brief description of the project;
- Terms applicable when transitioning from the previous permit;
- The requirement to submit a notice of permit termination when construction is completed;
- Automatic coverage under an expired, but administratively-continued permit;
- Capability to use this permit to acquire coverage for other construction-related industrial activities (*e.g.*, a concrete batch plant); and
- Storm water pollution prevention plan performance objectives.

For construction activities, sediment and erosional controls and storm water management measures are to be implemented as part of the permittee's storm water pollution prevention plan. The proposal also calls for the implementation of best management practices(BMPs) which will reduce pollutants in urban storm water in a cost effective way. Such BMPs are to include public education programs, public participation, monitoring illegal discharges from non-storm water sources, good housekeeping practices, and soil and erosion control measures in order to assure pollution reduction in urban storm waters.

The draft proposal (July 31,1997) allows for certain exemptions. These include:

1. sources that do not impact water quality;
2. sources in areas that receive low amounts of rainfall;
3. sources in areas where soil loss is less than two tons per year; and
4. sources that discharge in an area covered by the total maximum daily load or watershed plan.

The EPA has not yet made a ruling on how much of a role Total Maximum Daily Loads (TMDLs) will play in this proposal. Since TMDLs are numerical limits on how much of a pollutant a body of water can assimilate, specific measures may have to be designed in order to protect water quality of the receiving waters. The final rule for Phase II is expected to be finalized by March 1, 1999 and would replace the final rule regulating Phase II storm water discharges that was issued on August 7, 1995.

Federal Register, Volume 63, Number 31, February 17, 1998, pp. 7858-7906.
Code of Federal Regulations, Volume 40, Parts 122 and 123.

The Influence of Seawater on the Partitioning of Contaminants in Groundwater and Soils

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Introduction

Hazardous waste sites that are located in nearshore areas may be hydraulically connected to coastal and estuarine waters. For these sites, a major concern is the influence of seawater on the partitioning and potential migration of contaminants that are present in the soils and groundwater located at the site. Due to the interactions among seawater, groundwater, soils, sediments, and the chemical contaminants, complex physical and geochemical processes will affect the transport and mobility of chemicals from the waste site. The purpose of this article is to summarize the influence of seawater on important processes that may affect the solubility, partitioning, and transport of chemicals from nearshore landfills and disposal sites.

The potential influence of seawater on the migration of contaminants from nearshore soils and groundwater is a function of transport from density and tidal mixing and the physiochemical properties of seawater that will affect the solubility and binding capacity of chemicals which come into contact with the salt water. Because seawater is physically and chemically different than fresh groundwater, chemicals will behave differently in seawater than in fresh groundwater. Relative to a chemical's behavior in fresh groundwater, the properties of seawater that are most likely to affect chemical behavior are the presence of dissolved salts, higher concentrations of dissolved organic matter and colloidal material, a higher reduction-oxidation (redox) potential, greater buffering of pH, and changes in the kinetic rates of reactions over time.

Mixing

A typical nearshore disposal area may be visualized as consisting of the source of contamination, a contaminant plume, groundwater which may be confined or unconfined, and seawater intrusion areas (Figure 1). Aquifers located in coastal areas are generally recharged inland and the seaward slope of the strata causes the fresh water to flow seaward (Fetter 1994). Water is discharged from unconfined aquifers primarily by evapo-transpiration and by direct discharge into springs, streams, tidal waters, and the sea bottom (Fetter 1994). Because seawater has a higher density than the fresh groundwater, a density-dependent mixing zone will form at the boundary between the fresh and saline groundwater (Figure 1). In this zone, there will be a constant change in the composition of the fresh groundwater as it mixes with the saline groundwater.

In coastal areas with strong tides, tidal mixing zones may form from the movement of seawater into the aquifer. The tidally mixed zone may be important in estimating the amount of groundwater extracted due to tidal pumping (Moore 1996). Tidal pumping is used to describe the process where higher density tidal waters mix with groundwater at high tide, and then as the tide recedes, the mixture of seawater and fresh groundwater is drawn out into the coastal waters. Because this process repeats every tidal cycle, appreciable volumes of groundwater can be extracted by tidal pumping (Moore 1996).

Evidence of seawater intrusion can be obtained from groundwater monitoring wells that rise and fall in conjunction with tidal fluctuations and saline or brackish concentrations of seawater salts measured in groundwater or inland surface water samples. In some cases, water may be observed seeping from the site into the coastal/estuarine water. It is in these intrusion zones that the seawater will mix with the fresh groundwater and the physiochemical properties of seawater will influence the behavior of the contaminants. The seawater will either come into direct contact with the wastes or mix with groundwater that has already been contaminated.

Dissolved Salts

The most striking difference between seawater and fresh water is the content of dissolved salts in seawater. Giving the seawater its salty flavor, the dissolved salts or salinity content increases the water's density and changes the ionic strength of the solution. The dissolved salts have a profound effect on chemical activities and equilibrium concentrations of chemical reactions occurring within the solution (Horne 1969, Stumm and Morgan 1981, Pilson 1998). In general, ionic compounds will be more soluble in solutions with higher salinity while nonionic compounds will be less soluble. However, because of the competing electrostatic interactions among individual ions and their interactions with the surrounding ions in solution, it is very difficult to predict chemical behavior based on theoretical principles alone (Horne 1969, Stumm and Morgan 1981, Pilson 1998).

In seawater there is a constant proportion of the major salts relative to each other. Therefore, for a given salinity, the relative abundance of cations and anions will be constant (Brown *et al.* 1989). Because changes in salinity will have no effect on the relative proportions of the major salts, the ionic ratios in the solution will remain constant as seawater mixes with (is diluted by) fresh groundwater and the ionic strength will be directly proportional to changes in the salinity. In other words, as fresh groundwater becomes more saline, it will behave more like seawater.

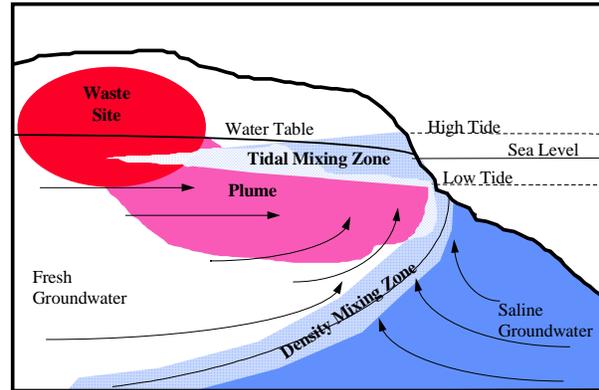


Figure 1. A typical coastal hazardous waste site. Diagram not to scale (adapted from Fetter 1994).

Dissolved Organic Matter

Most groundwaters have very low concentrations of dissolved and particulate organic matter. This is because the organic matter in groundwater is produced in surface water or soil and most groundwaters have long residence times (hundreds to thousands of years) so there is plenty of time for the organic matter to be broken down and mineralized by microbes (Thurman 1985). The concentration of dissolved organic carbon (DOC) in groundwaters is normally about 0.2 to 1.0 mg/L (Thurman 1985).

Due to the large amount of organic matter being carried to the sea, rivers usually have high concentrations of dissolved organic carbon (DOC 1 - 15 mg/L) (Thurman 1985). Oceanic seawater has relatively low DOC (0.3 - 2.0 mg/L), while coastal and estuarine waters have highly variable DOC concentrations, ranging from riverine levels at the high end to oceanic levels on the low end. On average, coastal and estuarine waters have from two to ten times more DOC than groundwaters. The interstitial waters of marine sediments have very high concentrations of DOC ranging from 4 - 20 mg/L in aerobic sediments to greater than 80 mg/L in anaerobic interstitial waters where O₂ has been depleted by microbial activity (Thurman 1985).

Although organic matter in natural waters is thermodynamically unstable, it can play a very important role in the fate and transport of contaminants in coastal and estuarine ecosystems. As seawater and groundwater mix, the DOC contributed from the seawater could have a profound effect on contaminant availability and mobility. The organic matter would coat any particles present changing the equilibrium between the solid and dissolved species.

DOC can bind with contaminants and is especially adept at adsorbing or trapping a wide variety of organic substances including toxic chemicals (Stumm and Morgan 1981). DOC also has the tendency to complex with metal ions. Depending on the situation, these complexed compounds can be transported as part of the DOC or they will be transferred to the solid phase. In either case, the complexed metal will be less toxic than the free metal ion. A large percentage the DOC consists of negatively-charged colloids. In the presence of calcium and magnesium cations, which are abundant in seawater, these colloids will coagulate and precipitate out of solution (sometimes referred to as the "salting out effect"). The fate of the contaminants will be determined by the behavior of the colloids in the water column and the pore spaces of the sediment.

Overall the net effect on contaminant migration from the interaction with DOC would be dependent on the specific conditions at the site. Given the length of time that most hazardous waste sites have been present, steady-state conditions probably predominate. Therefore data on the actual distribution coefficients between the dissolved and solid phases measured at the site would be very useful in evaluating the importance of various sorption mechanisms.

Reduction and Oxidation

Another process affecting chemical equilibrium in natural waters is the oxidation-reduction potential (redox potential). The redox potential is defined as the "oxidizing power of the system" (Riley and

Chester 1971, p. 76) and it represents the system's capability to transfer electrons between ions. In redox reactions, oxidation refers to the loss of an electron (e^-), reduction refers to gaining an electron, and the redox potential is positive if conditions favor oxidation and negative if conditions favor reduction.

Under reducing conditions heavy metals would have a tendency to gain electrons resulting in reactions that will lower the valence state, mobility, and toxicity of the metal. Whereas, under oxidizing conditions metal ions will have a tendency to undergo reactions that will cause the loss of electrons resulting in an increase in the valence state, mobility, and toxicity of the metal.

In natural waters, redox reactions are usually quite different from what would be predicted based on thermodynamics (Horne 1965, Stumm and Morgan 1981). This is because many redox reactions are slow and the redox potential is controlled by the presence of dissolved oxygen (O_2). Oxygen is a strong oxidizing agent. The content of dissolved oxygen in natural waters is controlled by the contact with the atmosphere, primary production which produces O_2 , and microbial breakdown of organic matter which consumes O_2 .

Seawater is usually an oxidizing environment, because seawater usually has high concentrations of O_2 . On the other hand, sediments are usually reducing environments, because there is high microbial activity and the sediments are isolated from the atmosphere. The redox of groundwater can vary greatly from oxidized groundwaters to very reduced groundwaters. In cases where seawater mixes with oxidized groundwater, there will only be minor changes in the redox potential and the presence of oxidized species would be favored. Chemicals would be more likely transported from the site under these conditions. In cases where seawater mixes with reduced groundwater, the potential to change the oxidation state is greater but it is unclear whether the oxidizing reactions would result in mobilizing contaminants. The oxidation and mobilization of heavy metals would be dependent on the rate of oxidation, which can be very slow, and the interaction with the solid phases present in the sediment. The solid phases present in reducing environments of the sediments include acid volatile sulfides (Di Toro *et al.* 1992), iron and manganese minerals (Stumm and Morgan 1981), and complex organic matter (Thurmond 1980, Stumm and Morgan 1981). These solid phases will be more important in controlling the availability and mobility of contaminants than changes in the redox potential caused by mixing with seawater.

pH Buffering

In natural waters the concentration of hydrogen is very important in determining chemical equilibrium. Commonly referred to as pH, the concentration (*i.e.* activity) of free hydrogen is controlled primarily by the carbonate system (and to a lesser degree the borate system). The carbonate system consists of dissolved (free) carbon dioxide ($CO_{2(g)}$), carboxylic acid (H_2CO_3), bicarbonate (HCO_3^{1-}), and carbonate (CO_3^{2-}). The carbonate system can be defined as the equilibrium between CO_2 in the atmosphere, the dissolved species in seawater, and the solid species (*e.g.* calcium carbonate - $CaCO_3$) in the sediments and aquifer materials (Pilson 1998).

Seawater is highly buffered and slightly alkaline. Highly buffered means that large changes in the hydrogen ion concentration will result in only small changes in the pH. The buffering occurs because the carbonate and borate species are present in high enough concentrations to bind with excess hydrogen ions. The buffering will continue until the carbonate and borate ions are exhausted and then a rapid change in pH will occur (Pilson 1998). Neutral groundwaters (pH=7) commonly occur when the groundwater pH is controlled by equilibrium with calcium carbonate (Allard 1995). Acidic groundwaters (pH=3) can occur if the groundwater has large concentrations of metal hydroxides obtained from the dissolution of iron and aluminum oxides (as can occur from mine tailings, Allard 1995). Very acidic (pH=2.57) groundwaters can also occur if groundwater is isolated from the atmosphere and microbial activity consumes all the available oxygen.

The change in pH was estimated for mixing seawater (S=35, T=25°C) with three types of groundwater (S=0, T=5°C) (see full article for details of calculations). The calculations were made for mixing with neutral groundwaters, acidic groundwaters, and very acidic groundwaters that were isolated from the atmosphere (Figure 2). The very acidic conditions would only occur if the groundwater were isolated from the atmosphere and all the O₂ was consumed by microbial activity. This is probably the minimum pH possible for natural groundwater. These calculations were checked by mixing a sample of Narragansett Bay water (S=30, pH=7.97) with deionized water from the laboratory. The pH measured in the dilutions of bay water showed good agreement with the theoretical calculations (Figure 2).

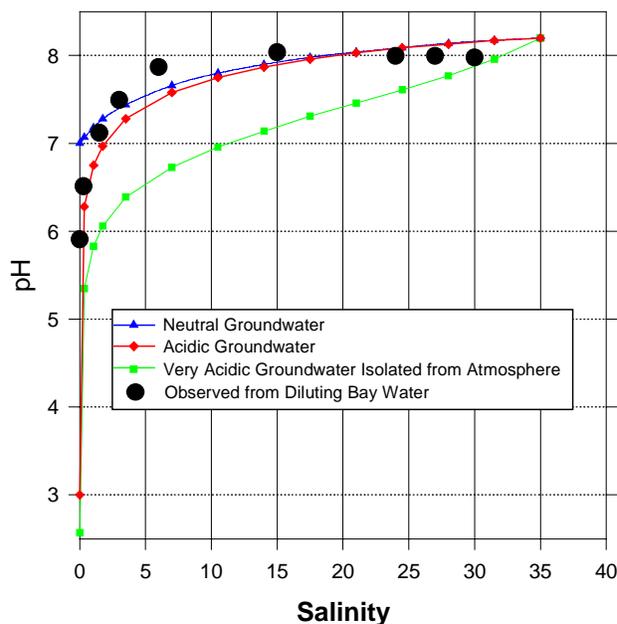


Figure 2. The change in pH as seawater mixes with groundwater.

The mixing simulations demonstrate the high buffering capacity of seawater (Figure 2). Initially, there are only small changes in pH. The pH of the solution remains near neutral until the solution is more than 90% groundwater (S=3.5), then a rapid change in pH occurs. This indicates that as groundwaters mix with saline waters, the pH is neutralized. Therefore, contaminants that would be more toxic and mobile at lower pH levels in the groundwater would become less toxic and less mobile before exposure to marine and estuarine receptors would occur.

The shift in pH will also cause changes in speciation of the chemicals present. For example, if iron-rich groundwaters with low pH mix with more alkaline seawater, the iron will precipitate as hydroxides and scavenge trace metals as coprecipitates. The precipitation can reduce the trace metal concentrations to levels far below what would be predicted from their solubility (Allard 1995). The actual conditions at the

site will be very important in determining the factors that will control contaminant mobility and toxicity. Because pH can be easily altered by improper sample handling, care must be taken to assure that samples are representative of the hydrological conditions at the site (Allard 1995, Fetter 1994).

Kinetic Considerations

Given the fact that most hazardous waste sites have been in existence for considerable periods (decades), it is very likely that steady-state conditions have developed. Steady-state means that a balance between the competing, complimentary, and interacting processes has been established. This balance is a result of opposing forces and it follows that if the conditions change, then a new steady state will arise from the processes that will be favored under the new conditions. The rate of change from one steady state to another and the importance of some processes over others can be evaluated by considering the kinetics of the reactions.

It is important to consider the kinetics of the system because over time the factors controlling sorption and desorption can change. Recent studies have shown that the longer contaminants reside in soils and sediments the more tightly bound, resistant, and less toxic they become (Hutzinger and Alexander 1995, Alexander 1995). The toxicity and mobility of the contaminants decreases with duration because the compounds become sequestered in inaccessible microsites within the soil matrix. One theory hypothesizes that this occurs because organic compounds continually diffuse further and further into the nanopores of the organic matter in the soil matrix greatly reducing their bioavailability, biodegradability, and transportability (Pignatello and Xing 1996).

Summary and Conclusions

The most important factor regarding the influence of seawater on the partitioning of contaminants in groundwater and soils is the situation at the site. Although every site is different, this review focused on factors and processes that are generally applicable to all sites. The complexity of the competing and interacting processes is apparent and the need to develop site-specific information is clear. The physical forces of tidal fluctuations and groundwater flow at the site will determine the degree to which tidal waters come into contact with contaminated material and the groundwater flow will determine the net discharge of groundwater into coastal and estuarine waters. Once the waters mix, the partitioning and sorption behavior of the contaminants will be governed by the physical and chemical properties of the resulting solutions (solvents) and substrates (sorbents) existing at the site.

Although the theoretical basis outlined above is very useful for providing a context for evaluating contaminant behavior, each site is essentially an experiment in progress and the outcome of the experiment can be best evaluated by direct observations made at the site. When the observations are conducted within a sound theoretical framework, the important factors that are controlling contaminant availability and transportability can be identified and explained. The information can then be used to develop practical remediation schemes.

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[EDITOR'S NOTE: The unabridged version of the preceding article is available for download via the Marine Environmental Update web page at <http://environ.spawar.navy.mil/Programs/MESO/Newsltr> or via USPS from the Marine Environmental Support Office upon request.]

Navy Tests Experimental Storm Water Treatment System

The Navy is again taking a lead in environmental remediation by addressing polluting contaminants in road runoff from storm drains. A new, experimental storm-water treatment system was installed on Naval Station San Diego land, north of the Magnetic Silencing Facility off Rosecrans Street, by the Space and Naval Warfare Systems Center, San Diego. The system, developed by a private research and development company, is nearly ready for operation and evaluation.

Mary Platter-Rieger, Marine Environmental Support Office (Code D3621), provided a presentation explaining the technology and a field trip to view the system. The meeting was attended by representatives from state, county, and city government including Caltrans, Port Authority, San Diego County Department of Health, and the Regional Water Quality Board. Representatives of private industry, concerned citizens, and the environmental community including the Surfriders Foundation, Friends of Famosa Slough, San Elijo Lagoon Committee, and the Sierra Club were also present. All attendees are involved with water quality issues.

The system consists of four large tanks assembled from a prefabricated kit. They are made from a recycled, sturdy plastic material that is meant to be buried underground. The material, though strong, is not able to support the weight of water without outside support. Since the designated installation site was on a prehistoric archeological site, the tanks were buried within a retaining wall of gravel held in place by cellular confinement material.

A PVC pipe leads down a hillside from a storm drain on the street to a catch basin below. The water flows first into a grit-filter bag and through an elbow pipe that traps oil and other floatables. Four skimmers transfer clarified water from three to four inches below the surface of the water to another chamber. Solid materials drop to the



Mary Platter-Rieger (at far right) recently provided a presentation on a newly installed storm-water treatment system to government and community representatives (U.S. Navy photograph).



Ms. Platter-Rieger (at left) at the site of the test system. Four large tanks are buried within a retaining wall of gravel held in place by cellular confinement material. A PVC pipe leads down the hillside from a storm to the catch basin below (U.S. Navy photograph).

Tri-Service Ecological Risk Assessment Working Group Update

The Tri-Service Ecological Risk Assessment Working Group (TSERAWG) Meeting was held at the Space and Naval Warfare Systems Center (SPAWARSYSCEN), San Diego, on January 27-28, 1998. Presentations by Drs. Apitz, Chadwick and Richter of SPAWARSYSCEN, San Diego, and DOD personnel from the Army Corps of Engineers Waterways Experiment Station, Naval Facilities Engineering Command Southwest Division, Pacific Division and Northern Division, and the Army Center for Health Promotion and Preventive Medicine occupied the first day of the workshop. On the second day, the morning was devoted to DOD ongoing subcommittee business, and the afternoon was a Navy-only meeting to discuss ecological risk assessment (ERA) issues.

The TSERAWG, a subcommittee of the Tri-Service Environmental Support Centers Coordinating Committee, has been organized to coordinate and develop uniform technical coordination and provide technical guidance to the services for the conduct of ecological risk assessments at sites worldwide. TSERAWG subcommittees address various ERA issues, such as developing soil screening levels. Through close interaction with regulatory agencies, industry and academic institutions, the TSERAWG will provide technical transfer to member organizations regarding the latest information on ERA applications. Additionally, the TSERAWG participates in technical reviews and evaluate various techniques and methodologies for support of methods and approaches in ERA.

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ABOUT THE MARINE ENVIRONMENTAL UPDATE

This newsletter is produced quarterly by the Marine Environmental Support Office (MESO), and is dedicated specifically to inform the Navy about marine environmental issues that may influence how the Navy conducts its operations. MESO is located at the Space and Naval Warfare Systems Center (SPAWARSYSCEN) San Diego, California. The mission of MESO is to provide Navy-wide technical and scientific support on marine environmental science, protection and compliance issues. This support covers a broad spectrum of activities, including routine requests for data and information, technical review and consultation, laboratory and field studies, comprehensive environmental assessments, and technology transfer. Significant developments in marine environmental law, policy, and scientific advancements will be included in the newsletter, along with references and points of contact for further information.

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